



# STPS10L45CT/CG/CF/CFP

## LOW DROP POWER SCHOTTKY RECTIFIER

### MAIN PRODUCTS CHARACTERISTICS

|             |        |
|-------------|--------|
| $I_{F(AV)}$ | 2x5 A  |
| $V_{RRM}$   | 45 V   |
| $T_j$ (max) | 150°C  |
| $V_F$ (max) | 0.46 V |

### FEATURES AND BENEFITS

- LOW FORWARD VOLTAGE DROP MEANING VERY SMALL CONDUCTION LOSSES
- LOW SWITCHING LOSSES ALLOWING HIGH FREQUENCY OPERATION
- INSULATED PACKAGE: ISOWATT220AB, TO-220FPAB  
Insulating voltage = 2000V DC  
Capacitance = 12pF
- AVALANCHE CAPABILITY SPECIFIED

### DESCRIPTION

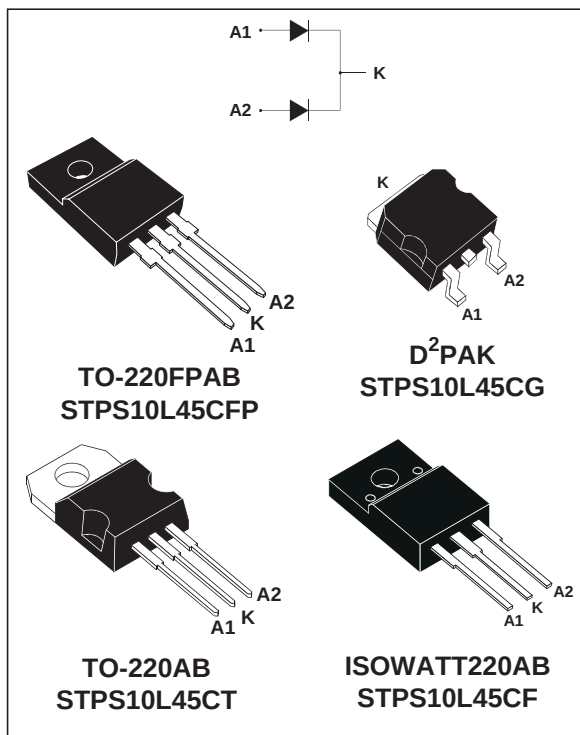
Dual center tap Schottky rectifiers suited for Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in TO-220AB, ISOWATT220AB, TO-220FPAB and D<sup>2</sup>PAK, these devices are intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications.

### ABSOLUTE RATINGS (limiting values, per diode)

| Symbol              | Parameter                                |                                |                                  |                         | Value         | Unit |
|---------------------|------------------------------------------|--------------------------------|----------------------------------|-------------------------|---------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage          |                                |                                  |                         | 45            | V    |
| I <sub>F(RMS)</sub> | RMS forward current                      |                                |                                  |                         | 20            | A    |
| I <sub>F(AV)</sub>  | Average forward current                  | TO-220AB<br>D <sup>2</sup> PAK | T <sub>c</sub> =135°C<br>δ = 0.5 | Per diode<br>Per device | 5<br>10       | A    |
|                     |                                          | ISOWATT220AB<br>TO-220FPAB     | T <sub>c</sub> =115°C<br>δ = 0.5 | Per diode<br>Per device | 5<br>10       | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current     |                                | tp = 10 ms Sinusoidal            |                         | 150           | A    |
| I <sub>RRM</sub>    | Repetitive peak reverse current          |                                | tp = 2 μs square F=1kHz          |                         | 1             | A    |
| I <sub>RSM</sub>    | Non repetitive peak reverse current      |                                | tp = 100 μs square               |                         | 2             | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power          |                                | tp = 1μs Tj = 25°C               |                         | 2700          | W    |
| T <sub>stg</sub>    | Storage temperature range                |                                |                                  |                         | - 65 to + 150 | °C   |
| Tj                  | Maximum operating junction temperature * |                                |                                  |                         | 150           | °C   |
| dV/dt               | Critical rate of rise of reverse voltage |                                |                                  |                         | 10000         | V/μs |

\* :  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink



## STPS10L45CT/CG/CF/CFP

### THERMAL RESISTANCES

| Symbol        | Parameter        |                                |                    | Value    | Unit |
|---------------|------------------|--------------------------------|--------------------|----------|------|
| $R_{th(j-c)}$ | Junction to case | TO-220AB<br>D <sup>2</sup> PAK | Per diode<br>Total | 3<br>1.7 | °C/W |
| $R_{th(c)}$   |                  |                                | Coupling           | 0.35     |      |
| $R_{th(j-c)}$ | Junction to case | ISOWATT220AB<br>TO-220FPAB     | Per diode<br>Total | 5<br>3.8 | °C/W |
| $R_{th(c)}$   |                  |                                | Coupling           | 2.5      |      |

When the diodes 1 and 2 are used simultaneously :  
 $\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$

### STATIC ELECTRICAL CHARACTERISTICS (per diode)

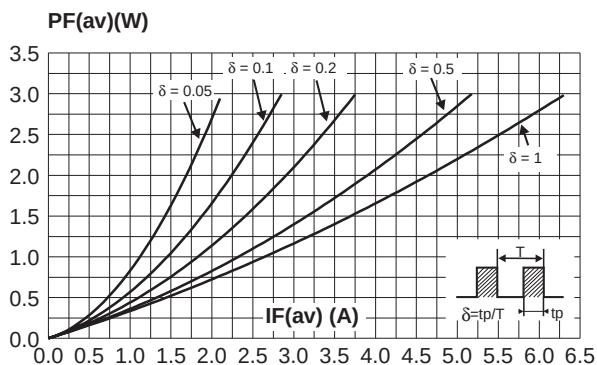
| Symbol  | Parameter               | Tests Conditions          |                     | Min. | Typ. | Max. | Unit |
|---------|-------------------------|---------------------------|---------------------|------|------|------|------|
| $I_R^*$ | Reverse leakage current | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$     |      |      | 0.15 | mA   |
|         |                         | $T_j = 125^\circ\text{C}$ |                     |      | 45   | 90   | mA   |
| $V_F^*$ | Forward voltage drop    | $T_j = 25^\circ\text{C}$  | $I_F = 5\text{ A}$  |      |      | 0.53 | V    |
|         |                         | $T_j = 125^\circ\text{C}$ | $I_F = 5\text{ A}$  |      | 0.36 | 0.46 |      |
|         |                         | $T_j = 25^\circ\text{C}$  | $I_F = 10\text{ A}$ |      |      | 0.67 |      |
|         |                         | $T_j = 125^\circ\text{C}$ | $I_F = 10\text{ A}$ |      | 0.49 | 0.59 |      |

Pulse test : \*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

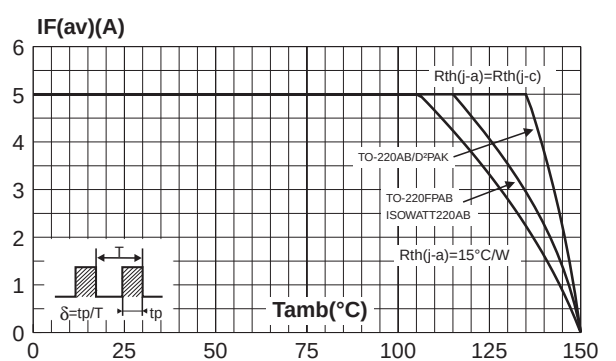
To evaluate the conduction losses use the following equation :

$$P = 0.33 \times I_{F(AV)} + 0.026 I_{F(RMS)}^2$$

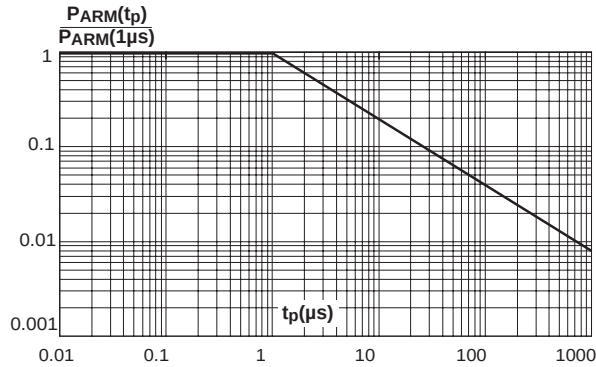
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



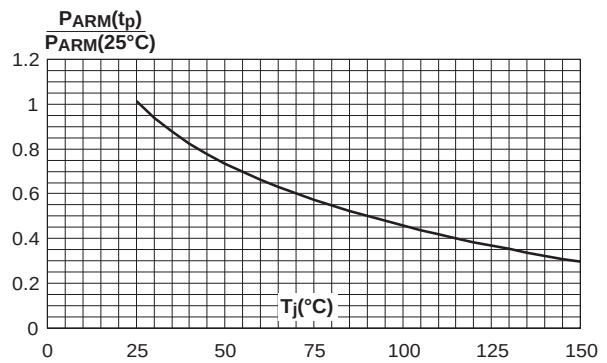
**Fig. 2:** Average forward current versus ambient temperature ( $\delta=0.5$ , per diode).



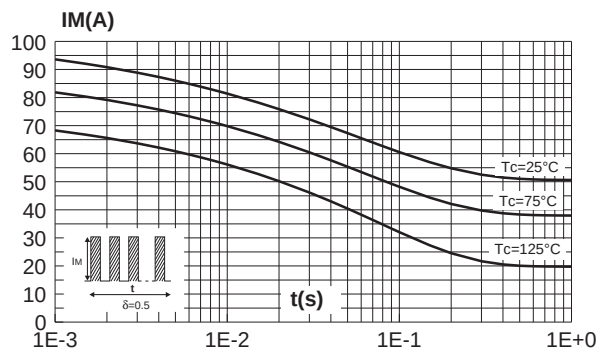
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



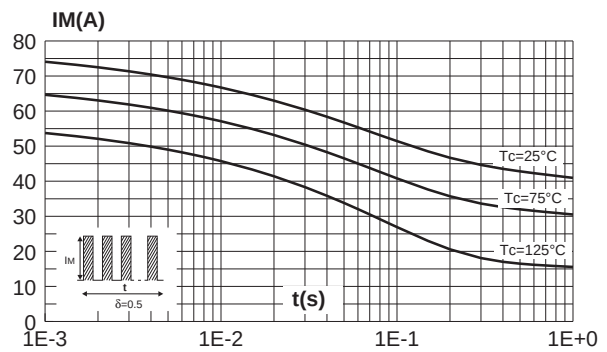
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



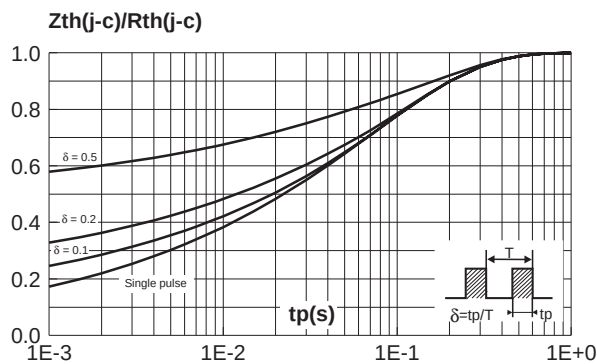
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB and D<sup>2</sup>PAK).



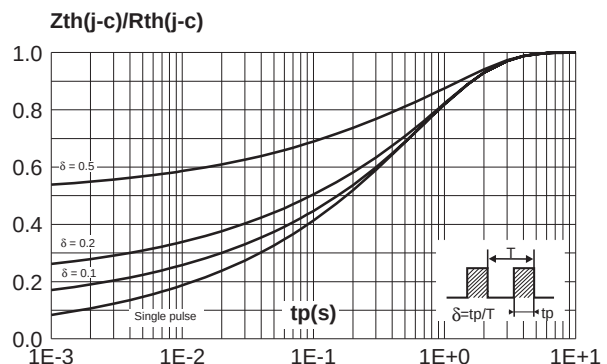
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (ISOWATT220AB, TO-220FPAB).



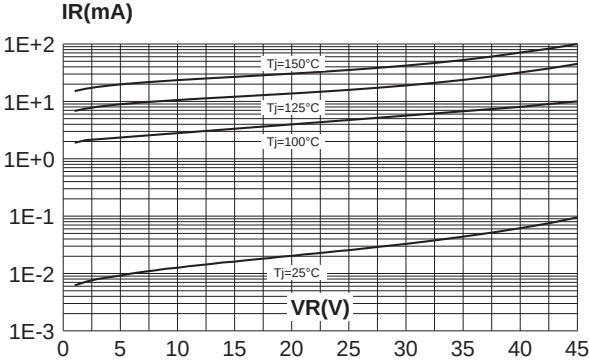
**Fig. 6-1:** Relative variation of thermal impedance junction to case versus pulse duration. (TO-220AB and D<sup>2</sup>PAK).



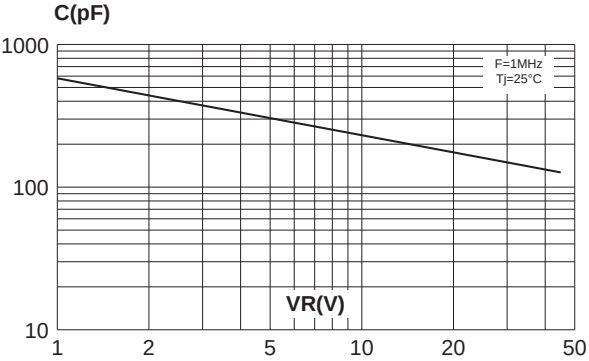
**Fig. 6-2:** Relative variation of thermal impedance junction to case versus pulse duration. (ISOWATT220AB, TO-220FPAB).



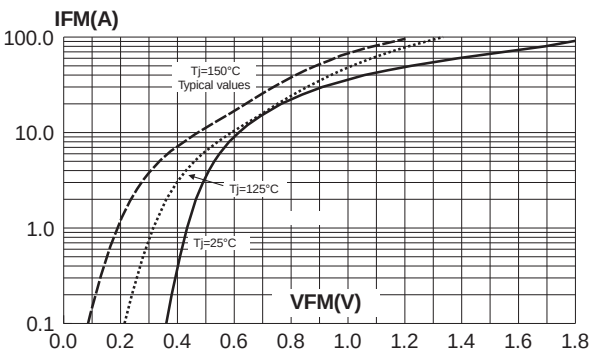
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values, per diode).



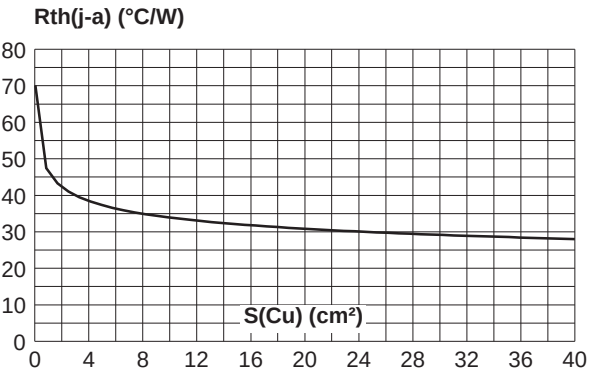
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values, per diode).

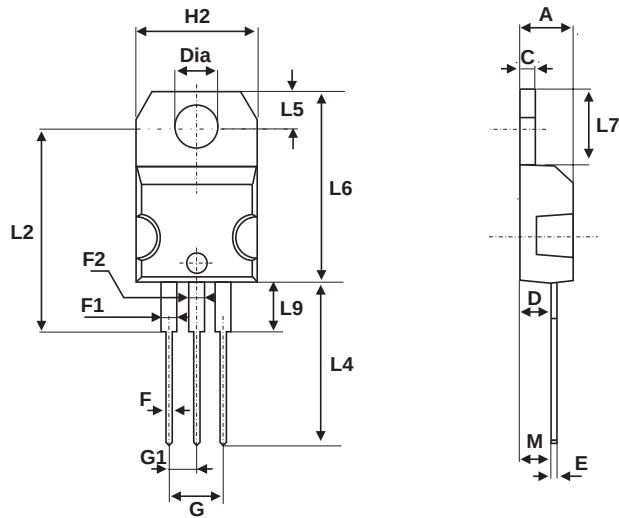


**Fig. 9:** Forward voltage drop versus forward current (maximum values, per diode).

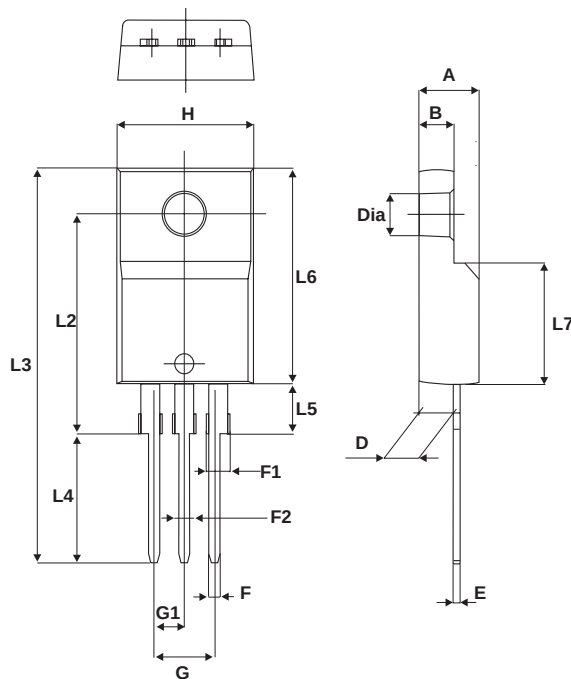


**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ )(D<sup>2</sup>PAK).



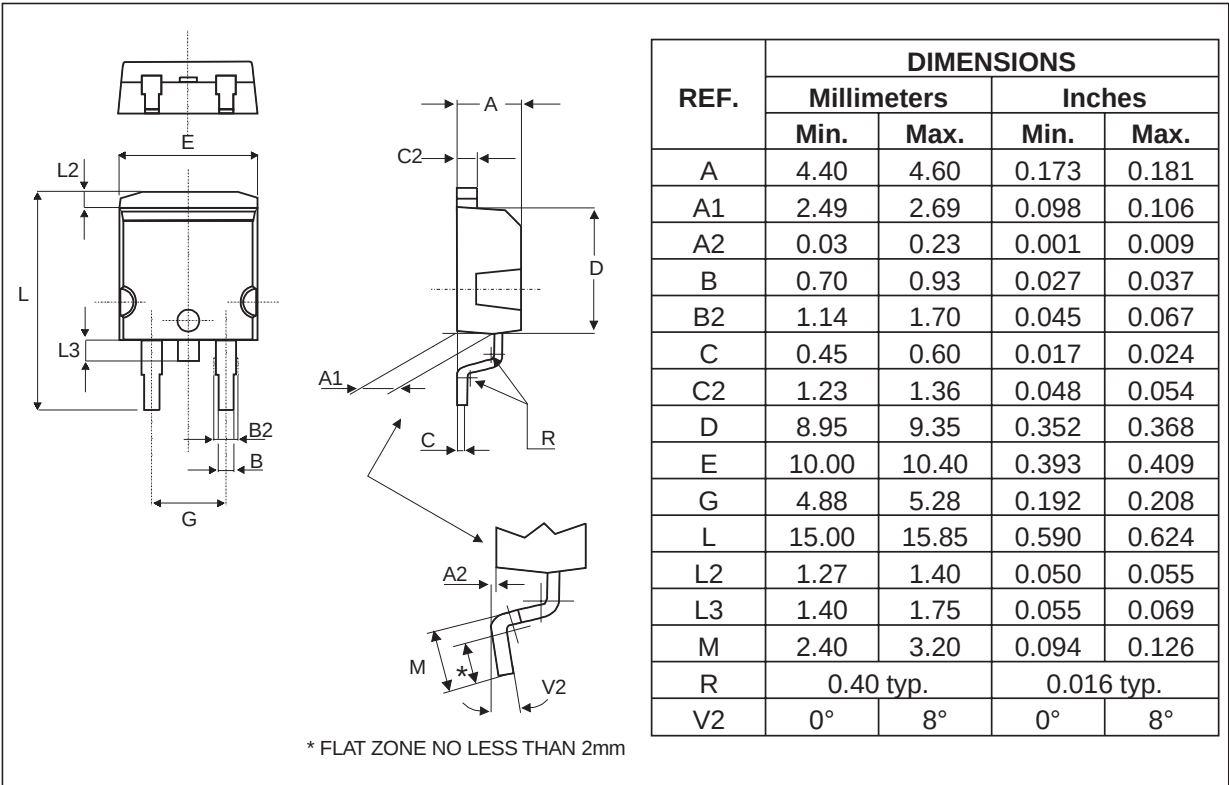
**PACKAGE MECHANICAL DATA**  
 TO-220AB


| REF.  | DIMENSIONS  |       |            |       |
|-------|-------------|-------|------------|-------|
|       | Millimeters |       | Inches     |       |
|       | Min.        | Max.  | Min.       | Max.  |
| A     | 4.40        | 4.60  | 0.173      | 0.181 |
| C     | 1.23        | 1.32  | 0.048      | 0.051 |
| D     | 2.40        | 2.72  | 0.094      | 0.107 |
| E     | 0.49        | 0.70  | 0.019      | 0.027 |
| F     | 0.61        | 0.88  | 0.024      | 0.034 |
| F1    | 1.14        | 1.70  | 0.044      | 0.066 |
| F2    | 1.14        | 1.70  | 0.044      | 0.066 |
| G     | 4.95        | 5.15  | 0.194      | 0.202 |
| G1    | 2.40        | 2.70  | 0.094      | 0.106 |
| H2    | 10          | 10.40 | 0.393      | 0.409 |
| L2    | 16.4 typ.   |       | 0.645 typ. |       |
| L4    | 13          | 14    | 0.511      | 0.551 |
| L5    | 2.65        | 2.95  | 0.104      | 0.116 |
| L6    | 15.25       | 15.75 | 0.600      | 0.620 |
| L7    | 6.20        | 6.60  | 0.244      | 0.259 |
| L9    | 3.50        | 3.93  | 0.137      | 0.154 |
| M     | 2.6 typ.    |       | 0.102 typ. |       |
| Diam. | 3.75        | 3.85  | 0.147      | 0.151 |

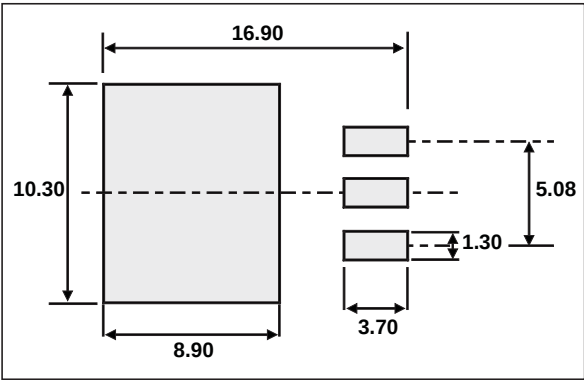
**PACKAGE MECHANICAL DATA**  
 TO-220FPAB


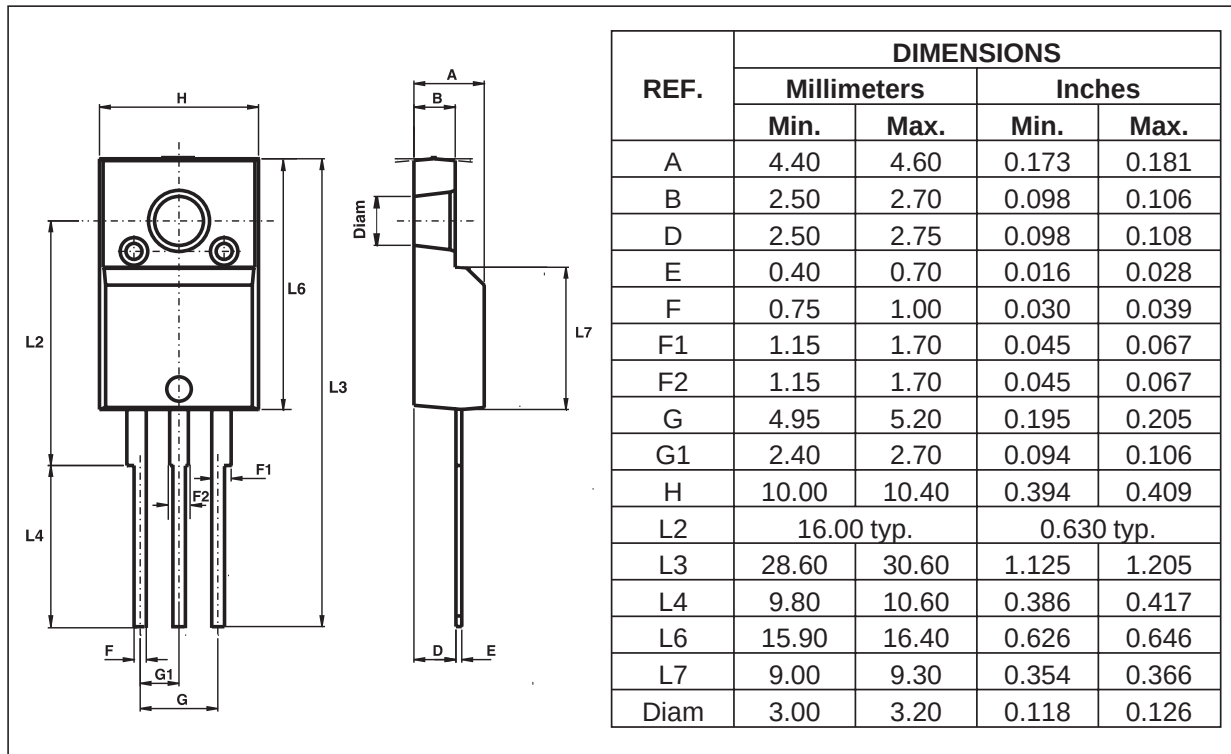
| REF. | DIMENSIONS  |      |           |       |
|------|-------------|------|-----------|-------|
|      | Millimeters |      | Inches    |       |
|      | Min.        | Max. | Min.      | Max.  |
| A    | 4.4         | 4.6  | 0.173     | 0.181 |
| B    | 2.5         | 2.7  | 0.098     | 0.106 |
| D    | 2.5         | 2.75 | 0.098     | 0.108 |
| E    | 0.45        | 0.70 | 0.018     | 0.027 |
| F    | 0.75        | 1    | 0.030     | 0.039 |
| F1   | 1.15        | 1.70 | 0.045     | 0.067 |
| F2   | 1.15        | 1.70 | 0.045     | 0.067 |
| G    | 4.95        | 5.20 | 0.195     | 0.205 |
| G1   | 2.4         | 2.7  | 0.094     | 0.106 |
| H    | 10          | 10.4 | 0.393     | 0.409 |
| L2   | 16 Typ.     |      | 0.63 Typ. |       |
| L3   | 28.6        | 30.6 | 1.126     | 1.205 |
| L4   | 9.8         | 10.6 | 0.386     | 0.417 |
| L5   | 2.9         | 3.6  | 0.114     | 0.142 |
| L6   | 15.9        | 16.4 | 0.626     | 0.646 |
| L7   | 9.00        | 9.30 | 0.354     | 0.366 |
| Dia. | 3.00        | 3.20 | 0.118     | 0.126 |

PACKAGE MECHANICAL DATA  
D<sup>2</sup>PAK



FOOT PRINT DIMENSIONS (in millimeters)



**PACKAGE MECHANICAL DATA**  
**ISOWATT220AB**


| Ordering type  | Marking      | Package            | Weight | Base qty | Delivery mode |
|----------------|--------------|--------------------|--------|----------|---------------|
| STPS10L45CT    | STPS10L45CT  | TO-220AB           | 2.23g  | 50       | Tube          |
| STPS10L45CFP   | STPS10L45CFP | TO-220FPAB         | 2 g    | 50       | Tube          |
| STPS10L45CG    | STPS10L45CG  | D <sup>2</sup> PAK | 1.48g  | 50       | Tube          |
| STPS10L45CG-TR | STPS10L45CG  | D <sup>2</sup> PAK | 1.48g  | 1000     | Tape & reel   |
| STPS10L45CF    | STPS10L45CF  | ISOWATT220AB       | 2.08g  | 50       | Tube          |

- Cooling method : by conduction (C)
- Recommended torque value : 0.55 N.m.
- Maximum torque value : 0.70 N.m.
- Epoxy meets UL94,V0

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